AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the above-identified application:

Listing of Claims:

1. (Currently Amended): A vibration and isolation apparatus comprising:

a fluid having a true fluid mass, a density and a viscosity;

a first fluid containment chamber containing a first portion of the fluid;

a second containment chamber containing a second portion of the fluid;

an annular damping path connecting the first fluid containment chamber and the second fluid containment chamber and providing a fluid path between the first fluid containment chamber and the second fluid containment chamber; and

wherein the ratio of the cross sectional area of the first fluid containment chamber and the second fluid containment chamber to the cross sectional area of the annular damping path is chosen to produce an effective mass of the fluid to enhance vibration damping and isolation, the effective mass of the fluid greater than the true fluid mass, wherein at least one of the cross sectional area of the damping path, the cross sectional area of the first fluid containment chamber, and the cross sectional area of the second fluid containment chamber is selected to provide ~~active~~ tuning of the effective mass of the fluid, wherein the effective fluid mass of the fluid is chosen to give the apparatus a roll-off of -60dB/decade.

2. (Currently Amended): The apparatus of claim 1 wherein the cross sectional area of the damping path is selected to permit ~~active~~ tuning of the effective mass of the fluid.

3. (Currently Amended): The apparatus of claim 1 wherein the cross sectional area of the first fluid containment chamber or the second fluid containment chamber is selected to permit ~~active~~ tuning of the effective mass of the fluid.

4. (Original): The apparatus of claim 1 wherein the apparatus supports a payload having a fixed mass.

5. (Original): The apparatus of claim 4 wherein the true mass of the fluid is less than the mass of the payload and the effective mass of the fluid is greater than or equal to the mass of the payload.

6. (Canceled).

7. (Previously Presented): The apparatus of claim 1 wherein the density of the fluid is selected to change the effective fluid mass.

8. (Previously Presented): A fluid filled isolator for vibration damping and isolation, the isolator comprising four tunable parameters and wherein the four tunable parameters comprising a first spring force in parallel with a second spring force, an effective fluid mass, the effective fluid mass based on a ratio of a cross sectional area of a first fluid containment chamber and a second fluid containment chamber to a cross sectional area of an annular damping path, and a first damper in series, wherein the effective fluid mass is equal to the true fluid mass multiplied by an amplification factor, and wherein the true fluid mass is less than a mass of a payload coupled to the isolator and the effective mass is equal to or greater than the mass of the payload.

9. (Canceled).

10. (Canceled).

11. (Previously Presented): The isolator of claim 8 wherein the first spring force is formed by a stiffness formed by the design of a first fluid chamber and a second fluid chamber.

12. (Original): The isolator of claim 11 wherein the damper is substantially provided by the shear force of the fluid through a damping annulus located between the first fluid chamber and the second fluid chamber.

13. (Original): The isolator of claim 12 wherein the second spring force is formed from a volumetric stiffness of the first fluid containment chamber and the second fluid containment chamber and axial stiffness coupled to the first fluid containment chamber and the second fluid containment chamber.

14. (Original): The isolator of claim 13 wherein the effective fluid mass is proportional to the ratio of the cross sectional area of the first fluid containment chamber and the second fluid containment chamber divided by the cross sectional area of the damping annulus, the quantity squared.

15. (Previously Presented): The isolator of claim 8 wherein the effective fluid mass to payload mass is chosen to provide a roll-off -60dB/decade.

16. (Currently Amended): A four-parameter fluid filled damping and isolation apparatus, comprising:

a shaft having an axis therethrough, the shaft having a first and second end;

a piston having an axial bore coaxially positioned with the shaft to provide a first parameter comprising a damper by forming a damping path therebetween, the piston having a flange extending radially therefrom for coupling the apparatus to a load;

a first extension coupled to and extending radially from the first end of the shaft;

a second extension coupled to and extending radially from the second end of the shaft;

secondary isolation means coaxially extending from the first and second extensions for providing a second parameter comprising a first volumetric stiffness in series with the damper;

a primary isolation means connecting the flange to the first extension and the second extension and coaxial with the shaft for providing a third parameter comprising a second volumetric stiffness in parallel with the damper and the secondary isolation means, the secondary isolation means connected to the primary isolation means via fluid paths through the first and second extensions; and

wherein a fourth parameter comprising the ratio of a cross sectional area of the primary-isolation means to a cross sectional area of the damping path, the ratio chosen to provide a fluid mass effect, the fluid mass effect determined by an effective mass of the fluid, the effective mass of the fluid greater than a true fluid mass, wherein the effective fluid mass of the fluid is chosen to give the apparatus a roll-off of -60dB/decade.

17. (Currently Amended): The apparatus of claim 16 wherein the cross sectional area of the primary isolation means can be varied to permit ~~active~~ tuning of the fluid mass effect.

18. (Currently Amended): The apparatus of claim 16 wherein the cross sectional area of the damping path can be changed to permit ~~active~~ tuning of the fluid mass effect.

19. (Canceled).

20. (Original): The apparatus of claim 16 wherein the fluid mass effect can be change by varying the mass of a fluid internal to the apparatus.

21. (Canceled).

22. (Canceled).

23. (Canceled).

24. (Canceled).

25. (Canceled).

26. (Currently Amended): A method of designing an apparatus for damping vibration and isolation of a payload ~~with an apparatus~~, the apparatus comprising a first fluid containment chamber containing a first portion of the fluid, the fluid having a true

fluid mass, a density and a viscosity; a second containment chamber containing a second portion of the fluid; and an annular damping path connecting the first fluid containment chamber and the second fluid containment chamber and providing a fluid path between the first fluid containment chamber and the second fluid containment chamber, the method comprising:

selecting a cross sectional area of the first fluid containment chamber;

selecting a cross sectional area of the second fluid containment chamber; and

selecting a cross sectional area of the annular damping path,

wherein the cross sectional areas of the first fluid containment chamber, the second fluid containment chamber, and the annual damping path are selected such that the ratio of the cross sectional area of the first fluid containment chamber and the second fluid containment chamber to the cross sectional area of the damping path produce an effective mass of the fluid to enhance vibration damping and isolation, the effective mass of the fluid greater than the true fluid mass.

27. (Currently Amended): The method of claim 26, wherein the selecting steps include ~~actively~~ tuning of the effective mass of the fluid.

28. (Previously Presented): The method of claim 26, wherein the selecting steps include selecting the cross sectional areas such that the effective mass of the fluid is greater than or equal to a mass of the payload.

29. (Previously Presented): The method of claim 26, further comprising selecting a density of the fluid to change the effective fluid mass.

30. (Previously Presented): The method of claim 26, wherein the selecting steps include selecting the cross sectional areas such that the effective fluid mass provides a roll-off -60 dB/decade.